Complete Summary

GUIDELINE TITLE

The use of electronic fetal monitoring. The use and interpretation of cardiotocography in intrapartum fetal surveillance.

BIBLIOGRAPHIC SOURCE(S)

Royal College of Obstetricians and Gynaecologists. The use of electronic fetal monitoring. The use and interpretation of cardiotocography in intrapartum fetal surveillance. London: RCOG Press; 2001 May. 136 p. (Evidence-based clinical guidelines; no. 8). [246 references]

COMPLETE SUMMARY CONTENT

SCOPE

DISEASE/CONDITION(S)

- Fetal distress (fetal bradycardia and hypoxia)
- Pregnancy
- Labour

GUIDELINE CATEGORY

Diagnosis
Management

CLINICAL SPECIALTY

Family Practice
Obstetrics and Gynecology
Pediatrics

INTENDED USERS

Advanced Practice Nurses
Nurses
Patients
Physician Assistants
Physicians

GUIDELINE OBJECTIVE(S)

- To evaluate the impact of intrapartum electronic fetal monitoring on neonatal and maternal outcomes
- To develop standards for the use of electronic fetal monitoring, including:
    - Indications for use, definitions of normal and abnormal parameters
    - Which adjuvant or additional monitoring tests/techniques should be employed
- To evaluate methods for improving interpretation of cardiotocography and the development of standards for training in evaluation of fetal heart-rate patterns
- To evaluate the impact of electronic fetal monitoring on medico-legal aspects of perinatal medicine
- To increase awareness of the role of electronic fetal monitoring in intrapartum care among medical practitioners, midwives and pregnant women
- To consider the resource implications of the use of electronic fetal monitoring
- To suggest areas for future research from a review of the currently available evidence

TARGET POPULATION

Pregnant women

INTERVENTIONS AND PRACTICES CONSIDERED

1. Assessment of risk factors (maternal or fetal problems, intrapartum risk factors) for fetal compromise
2. Maternal pulse palpation
3. Intermittent electronic fetal monitoring
4. Continuous electronic fetal monitoring
5. Intermittent auscultation
6. Admission cardiotocography
7. Alternative and adjuvant tests of fetal well-being:
    - Fetal blood sampling
    - Fetal scalp lactate measurement
    - Fetal electrocardiogram (ECG) analysis
    - Fetal stimulation testing
    - Near infrared spectroscopy to measure cerebral oxygen concentration
    - Fetal pulse oximetry
    - Prediction of fetal well-being using vibroacoustic stimulation, amniotic fluid index, intrapartum umbilical artery Doppler, fetal movements, and combined testing

8. Therapies for fetal compromise including maternal oxygen administration, changes in maternal position, reduction of uterine activity through tocolytic therapy (e.g., terbutaline), transcervical amnioinfusion, and delivery
9. Providing training in electronic fetal monitoring to staff
10. Establishing clear and accurate communication channels between mother and health care professionals before during labour to ensure informed consent
11. Accurate documentation and record-keeping of all procedures and outcomes

MAJOR OUTCOMES CONSIDERED

Fetal

- Perinatal mortality rates
- Cerebral palsy rates
- Neurodevelopmental disability rates
- Neonatal convulsion rates
- Fetal heart rate abnormalities
- Umbilical artery acid-base status
- Apgar score
- Neonatal encephalopathy

Maternal

- Intervention rates (e.g., caesarean section rates, instrumental delivery rates)
- Measures of maternal response (satisfaction and anxiety)

METHODOLOGY

METHODS USED TO COLLECT/SELECT EVIDENCE

Searches of Electronic Databases

DESCRIPTION OF METHODS USED TO COLLECT/SELECT THE EVIDENCE

Literature Search Strategy

The aim of the literature review was to identify and synthesize relevant evidence within the published literature, in order to answer the specific clinical questions. Thus, clinical practice recommendations are based on evidence where possible. Gaps in the evidence for which future research is needed are identified.

Searches were carried out for each topic of interest. The Cochrane Library, up to Issue 3 (2000) was searched to identify systematic reviews (with or without meta-analyses) of randomised controlled clinical trials, and randomised controlled trials. The electronic database, MEDLINE (CD Ovid version), was searched for the period January 1966 to November 2000, including foreign language publications. The electronic database EMBASE was searched between 1988 to November 2000 to identify publications, usually European, not indexed on MEDLINE. MIDIRS (Midwives Information and Resource Service), CINAHL (Cumulative Index to Nursing and Allied Health Literature) and the British Nursing Index were searched to ensure that relevant nursing and midwifery literature were included.

Guidelines by other development groups were searched for on the National Guidelines Clearinghouse database, as were the TRIP database and OMNI service on the Internet. The reference lists in these guidelines were checked against our searches to identify any missing evidence.

The Database of Abstracts and Reviews of Effectiveness (DARE) was searched. Reference lists of non-systematic review articles and studies obtained from the initial search were reviewed and journals in the Royal College of Obstetrics and Gynaecologists library were hand-searched to identify articles not yet indexed.

There was no systematic attempt to search the â ˜grey literature´ (conferences, abstracts, theses and unpublished trials).

The economic evaluation included a search of the NHS Economic Evaluation Database (The Cochrane Library, Issue 1, 2001), MEDLINE January 1966 to November 2000, and EMBASE 1988 to November 2000. Relevant experts in the field were contacted for further information.

Searches were performed using generic and specially developed filters, relevant MeSH (medical subject headings) terms and free-text terms. Details of all literature searches are available on application to the Royal College of Obstetrics and Gynaecologists Clinical Effectiveness Support Unit.

Sifting and Reviewing the Literature

A preliminary scrutiny of titles and abstracts was undertaken and full papers were obtained if the research question addressed the Guideline Development Group´s question relevant to the topic. Following a critical review of the full version of the study, articles not relevant to the subject in question were excluded. Studies that did not report on relevant outcomes were also excluded.

For all the subject areas, evidence from the study designs least subject to sources of bias were included. Where possible, the highest levels of evidence were used, but all papers were reviewed using established guides. Published systematic reviews or meta-analyses were used if available.

For subject areas where neither was available, other appropriate experimental or observational studies were sought.

NUMBER OF SOURCE DOCUMENTS

Not stated

METHODS USED TO ASSESS THE QUALITY AND STRENGTH OF THE EVIDENCE

Weighting According to a Rating Scheme (Scheme Given)

RATING SCHEME FOR THE STRENGTH OF THE EVIDENCE

Levels of Evidence

Ia Evidence obtained from systematic review of meta-analysis of randomised controlled trials

Ib Evidence obtained from at least one randomised controlled trial

IIa Evidence obtained from at least one well-designed controlled study without randomisation

IIb Evidence obtained from at least one other type of well-designed quasi-experimental study

III Evidence obtained from well-designed non-experimental descriptive studies, such as comparative studies, correlation studies and case studies

IV Evidence obtained from expert committee reports or opinions and/or clinical experience of respected authorities

METHODS USED TO ANALYZE THE EVIDENCE

Systematic Review with Evidence Tables

DESCRIPTION OF THE METHODS USED TO ANALYZE THE EVIDENCE

Identified articles were assessed methodologically and the best available evidence was used to form and support the recommendations. The highest level of evidence was selected for each clinical question. Using the evidence-level structure shown above, the retrieved evidence was graded accordingly.

The definitions of the types of evidence used in this guideline originate from the U.S. Agency for Health Care Policy and Research (now known as the U.S. Agency for Healthcare Research and Quality).

The clinical question dictates the highest level of evidence that should be sought. For issues of therapy or treatment the highest level of evidence is meta-analyses of randomised controlled trials or randomised controlled trials. This would equate to a grade A recommendation.

For issues of prognosis, a cohort study is the best level of evidence available. The best possible level of evidence would equate to a grade B recommendation. It should not be interpreted as an inferior grade of recommendation, as it represents the highest level of evidence attainable for that type of clinical question.

Electronic fetal monitoring represents both a screening and a diagnostic test but not a treatment. Studies examining the performance of this test may take the form of randomised controlled trials or cohort studies.

All retrieved articles have been appraised methodologically using established guides. Where appropriate, if a systematic review, meta-analysis or randomised controlled trial existed in relation to a topic, studies of a weaker design were ignored.

The evidence was synthesized using qualitative methods. These involved summarising the content of identified papers in the form of evidence tables and agreeing brief statements that accurately reflect the relevant evidence.

Quantitative techniques (meta-analysis) were not performed because of time constraints and the difficulty of combining studies of various designs.

For the purposes of this guideline, data are presented as risk ratios (RR) where relevant (i.e., in randomized controlled trials and cohort studies). Where these data are statistically significant they are also presented as numbers needed to treat (NNT).

Where possible, the resource implications were discussed by the Guideline Development Group and formally appraised by the group economist when the recommendations would result in a significant change to current clinical practice. However, much of this discussion has been hampered by the lack of published data regarding the current use of different monitoring modalities in specific pregnancy groups. Furthermore, the proportion implied by the recommendations within the guideline cannot be fully quantified as a result of this.

METHODS USED TO FORMULATE THE RECOMMENDATIONS

Expert Consensus (Nominal Group Technique)

DESCRIPTION OF METHODS USED TO FORMULATE THE RECOMMENDATIONS

The Guideline Development Group was presented with the best available research evidence to answer their questions. From this, recommendations for clinical practice were derived using consensus methods. Where there were areas without available research evidence, consensus was again used.

Recommendations were based on, and explicitly linked to, the evidence that supported them. Consensus was reached using the nominal group technique. Using this method, the draft recommendations their previous grading were graded by the Guideline Development Group prior to the meeting. These recommendations and the grading given to them were then considered during the meeting and a group opinion was reached. The recommendations were then graded according to the level of evidence upon which they were based.

It is accepted that, in this grading system, the evidence itself is not graded according to the individual methodological quality of the studies, although it is discussed in the text supporting each recommendation.

Grade 'C' recommendations and good practice points are not based on directly applicable research evidence. However, the views of the Guideline Development Group, combined with comments from the extensive peer review, suggest that the recommendations attached to these gradings are acceptable to a wide body of expert opinion.

RATING SCHEME FOR THE STRENGTH OF THE RECOMMENDATIONS

The recommendations were graded according to the level of evidence upon which they were based. The grading scheme used was based on a scheme formulated by the Clinical Outcomes Group (COG) of the National Health Service (NHS) Executive.

Grade A - Requires at least one randomised controlled trial as part of a body of literature of overall good quality and consistency addressing the specific recommendation (evidence levels Ia, Ib)

Grade B - Requires the availability of well-conducted clinical studies but no randomised clinical trials on the topic of the recommendation (evidence levels IIa, IIb, III)

Grade C - Requires evidence obtained from expert committee reports or opinions and/or clinical experience of respected authorities. Indicates an absence of directly applicable clinical studies of good quality (evidence level IV)

COST ANALYSIS

Two published studies investigate the resource implications of a policy of continuous electronic fetal monitoring versus intermittent auscultation in labour, one in the United States of America and one in the United Kingdom.

The United Kingdom study estimated the cost of continuous electronic fetal monitoring based on a systematic review published in 1989. The systematic review was substantially updated in 1999, and the cost estimates have been re-worked accordingly for this guideline.

Cost estimates show that continuous electronic fetal monitoring is more costly than intermittent auscultation for two main reasons. The first and most important reason is the increased rate of caesarean section with electronic fetal monitoring. The second is higher equipment and materials costs.

METHOD OF GUIDELINE VALIDATION

Clinical Validation-Pilot Testing
External Peer Review
Internal Peer Review

DESCRIPTION OF METHOD OF GUIDELINE VALIDATION

Successive drafts of the guideline were written and discussed by the Guideline Development Group. At the fourth draft stage, a formal peer review process was undertaken. Reviewers included representatives from stakeholder organisations registered with National Institute for Clinical Excellence (NICE) and individuals or organisations from the area of practice represented in the Guideline Development Group. The draft guideline was submitted to these individuals or organisations with a request for appraisal and comment.

The comments made by the peer reviewers were collated and presented anonymously for consideration by the Guideline Development Group. All peer

review comments were considered systematically by the Group and the resulting actions and responses were recorded; 361 responses to 331 peer review comments were agreed by the Guideline Development Group and 64.4% of the comments resulted in amendments to the guideline. Further information is available upon request.

The guideline was also reviewed by the National Institute for Clinical Excellence Guidelines Advisory Committee. The guideline was sent to a further group of reviewers who particularly concentrated on the methodology used in its development under the independent guideline appraisal system approved by the National Health System Executive. The recommendations made following this process have been incorporated into the guideline.

The guideline was made available for public comment on the National Institute for Clinical Excellence Web site for a period of four weeks. The Guideline Development Group received a total of 11 individual sets of comments, over half of which resulted in minor amendments to the guideline.

National Institute for Clinical Excellence sent the guideline to a group of commercial organisations involved in the manufacturer of electronic fetal monitors, for their comments.

The clinical practice algorithm was piloted at six hospitals.

RECOMMENDATIONS

MAJOR RECOMMENDATIONS

In addition to these evidence-based recommendations, the guideline development group also identifies points of best clinical practice in the full-text guideline document.

Levels of evidence (Ia-IV) and grading of recommendations (A–C) are defined at the end of the Major Recommendations field.

The Development of Fetal Monitoring

The key outcome measures that should be used to assess the impact and role of electronic fetal monitoring are summarized below.

B - Absolute outcome measures of fetal/neonatal hypoxia to be collected at a local and regional level should be:

- Perinatal death
- Cerebral palsy
- Neurodevelopmental disability

Collection and interpretation at a national level would then be possible.

B - Intermediate fetal/neonatal measures of fetal hypoxia to be collected should be:

- Umbilical artery acid-base status
- Apgar score at five minutes
- Neonatal encephalopathy

These should be collected on a local (hospital/trust) level.

B - Umbilical artery acid-base status should be assessed by collection of paired samples from the umbilical artery and umbilical vein.

C - Umbilical artery acid-base status should be performed as a minimum after:

- Emergency caesarean section is performed
- Instrumental vaginal delivery is performed
- A fetal blood sample has been performed in labour
- Birth, if the baby´s condition at birth is poor

C - Maternal outcome measures that should be collected include:

- Operative delivery rates (caesarean section and instrumental vaginal delivery)

This should be collected on a local (hospital/trust) level.

Indications for the Use of Continuous Electronic Fetal Monitoring

There are a number of antenatal and intrapartum risk factors that have been shown to be associated with the development of neonatal encephalopathy, cerebral palsy or even perinatal death.

B - Continuous electronic fetal monitoring should be offered and recommended for high-risk pregnancies where there is an increased risk of perinatal death, cerebral palsy or neonatal encephalopathy

B - Continuous electronic fetal monitoring should be used where oxytocin is being used for induction or augmentation of labour.

Care of Women

The assessment of fetal well-being is only one component of intrapartum care. It is an important area where due consideration must be given to maternal preference and priorities in the light of potential risk factors to both mother and baby, i.e. one that strikes the right balance between the objective of maximising the detection of potentially compromised babies and the goal of minimising the number of unnecessary maternal interventions. The provision of accurate information in these circumstances is essential to allow each woman to make the right decision for her.

C - Women must be able to make informed choices regarding their care or treatment via access to evidence-based information. These choices should be recognised as an integral part of the decision making process.

C - Women should have the same level of care and support regardless of the mode of monitoring.

C - Trusts should ensure that there are clear lines of communication between carers, and consistent terminology is used to convey urgency or concern regarding fetal well-being.

C - Prior to any form of fetal monitoring, the maternal pulse should be palpated simultaneously with fetal heart rate auscultation in order to differentiate between maternal and fetal heart rates.

C - If fetal death is suspected despite the presence of an apparently recordable fetal heart rate, then fetal viability should be confirmed with real-time ultrasound assessment.

C - With regard to the conduct of intermittent auscultation:

- The fetal heart rate should be auscultated at specified intervals
- Any intrapartum events that may affect the fetal heart rate should be noted contemporaneously in the maternal notes, signed and the time noted.

C - With regard to the conduct of electronic fetal monitoring:

- The date and time clocks on the electronic fetal monitoring machine should be correctly set.
- Traces should be labeled with the mother´s name, date and hospital number.
- Any intrapartum events that may affect the fetal heart rate should be noted contemporaneously on the electronic fetal monitoring trace, signed and the date and time noted (e.g. vaginal examination, fetal blood sample, siting of an epidural).
- Any member of staff who is asked to provide an opinion on a trace should note their findings on both the trace and maternal case notes, together with time and signature.
- Following the birth, the care-giver should sign and note the date, time and mode of birth on the electronic fetal monitoring trace.
- The electronic fetal monitoring trace should be stored securely with the maternal notes at the end of the monitoring process.

Appropriate Monitoring in an Uncomplicated Pregnancy

A - For a woman who is healthy and has had an otherwise uncomplicated pregnancy, intermittent auscultation should be offered and recommended in labour to monitor fetal well-being.

A - In the active stages of labour, intermittent auscultation should occur after a contraction, for a minimum of 60 seconds, and at least:

- Every 15 minutes in the first stage
- Every 5 minutes in the second stage

A - Continuous electronic fetal monitoring should be offered and recommended in pregnancies previously monitored with intermittent auscultation:

- If there is evidence on auscultation of a baseline less than 110 bpm or greater than 160 bpm
- If there is evidence on auscultation of any decelerations
- If any intrapartum risk factors develop.

B - Current evidence does not support the use of the admission cardiotocography in low-risk pregnancy and it is therefore not recommended.

Additional Tests And Therapies Used in Combination With Electronic Fetal Monitoring

A - Units employing electronic fetal monitoring should have ready access to fetal blood sampling facilities.

A - Where delivery is contemplated because of an abnormal fetal heart rate pattern, in cases of suspected fetal acidosis, fetal blood sampling should be undertaken in the absence of technical difficulties or any contraindications.

B - Contraindications to fetal blood sampling include:

- Maternal infection (e.g. human immunodeficiency virus [HIV], hepatitis viruses and herpes simplex virus)
- Fetal bleeding disorders (e.g., haemophilia)
- Prematurity (<34 weeks)

C - Prolonged use of maternal facial oxygen therapy may be harmful to the fetus and should be avoided. There is no research evidence evaluating the benefits or risks associated with the short-term use of maternal facial oxygen therapy in cases of suspected fetal compromise.

B - Fetal blood sampling should be undertaken with the mother in the left-lateral position.

B - During episodes of abnormal fetal heart rate patterns when the mother is lying supine, the mother should adopt the left-lateral position.

B - In cases of uterine hypercontractility in association with oxytocin infusion and with a suspicious or pathological cardiotocography, the oxytocin infusion should be decreased or discontinued.

A - In the presence of abnormal fetal heart rate patterns and uterine hypercontractility (not secondary to oxytocin infusion) tocolysis should be considered. A suggested regimen is subcutaneous terbutaline 0.25 mg.

A - In cases of suspected or confirmed acute fetal compromise, delivery should be accomplished as soon as possible, accounting for the severity of the fetal heart rate abnormality and relevant maternal factors. The accepted standard has been that, ideally, this should be accomplished within 30 minutes.

C - Classification of fetal blood sample results:

Fetal Blood Sample Result (pH)*	Subsequent Action
≥7.25	Fetal blood sample should be repeated if the fetal heart rate abnormality persists
7.21 to 7.24	Repeat fetal blood sample within 30 minutes or consider delivery if rapid fall since last sample
≤7.20	Delivery indicated

* All scalp pH estimations should be interpreted taking into account the initial pH measurement, the rate of progress in labour and the clinical features of the mother and baby.

Education and Training

Continuous electronic fetal monitoring only provides a printed recording of the fetal heart rate pattern. The interpretation of the fetal heart rate record is subject to human error. Education and training improve standards of evaluating the fetal heart rate.

C - Trusts should ensure that staff with responsibility for performing and interpreting the results of electronic fetal monitoring should receive annual training with assessment to ensure that their skills are kept up to date. For details of key elements of training, see Section 9.1 of the original guideline document.

C - Trusts should ensure that resources and time are made available to facilitate training in both intermittent auscultation and electronic fetal monitoring and no staff should be expected to fund their own training.

C - Staff should have easy access to computer-assisted and/or interactive training programmes.

C - Training should include instruction on documenting traces and their storage.

C - Training should include instruction on appropriate clinical responses to suspicious or pathological traces.

C - Training should include instruction on the channels of communication to follow in response to a suspicious or pathological trace.

C - Training should include a section on local guidelines relating to fetal monitoring, both intermittent auscultation and electronic fetal monitoring.

Risk Management and the Use of Electronic Fetal Monitoring

C - Electronic fetal monitoring traces should be kept for a minimum of 25 years.

C - Tracer systems should be developed to ensure that cardiotocographies removed for any purpose (e.g., risk management, teaching purposes) can always be located.

Definitions:

Grading of Recommendations:

Grade A - Requires at least one randomised controlled trial as part of a body of literature of overall good quality and consistency addressing the specific recommendation (evidence levels Ia, Ib)

Grade B – Requires the availability of well-conducted clinical studies but no randomised clinical trials on the topic of the recommendation (evidence levels IIa, IIb, III)

Grade C – Requires evidence obtained from expert committee reports or opinions and/or clinical experience of respected authorities. Indicates an absence of directly applicable clinical studies of good quality (evidence level IV)

Levels of Evidence

Ia Evidence obtained from systematic review of meta-analysis of randomised controlled trials

Ib Evidence obtained from at least one randomised controlled trial

IIa Evidence obtained from at least one well-designed controlled study without randomisation

IIb Evidence obtained from at least one other type of well-designed quasi-experimental study

III Evidence obtained from well-designed non-experimental descriptive studies, such as comparative studies, correlation studies and case studies

IV Evidence obtained from expert committee reports or opinions and/or clinical experience of respected authorities

CLINICAL ALGORITHM(S)

An algorithm is provided for the use of electronic fetal monitoring

EVIDENCE SUPPORTING THE RECOMMENDATIONS

TYPE OF EVIDENCE SUPPORTING THE RECOMMENDATIONS

The type of supporting evidence is identified and graded for each recommendation (see "Major Recommendations").

BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS

POTENTIAL BENEFITS

Fetal

- Decreased perinatal mortality rates
- Decreased cerebral palsy rates
- Decreased neurodevelopmental disability rates
- Detection of fetal heart rate abnormalities
- Decreased neonatal encephalopathy

Maternal

- Decreased intervention rates
- Improved maternal response (satisfaction and anxiety)

Subgroups Most Likely to Benefit:

Women with risk-risk pregnancies (see clinical practice algorithm in the original guideline document), where there is an increased risk of perinatal death, cerebral palsy, or neonatal encephalopathy

POTENTIAL HARMS

- Intermittent electronic fetal monitoring is associated with a significant increase in caesarean section rates in comparison with intermittent auscultation using a Pinard stethoscope.
- In healthy women who have had an uncomplicated pregnancy, continuous electronic fetal monitoring increases maternal intervention rates without any demonstrable improvement in perinatal outcome.
- Interpretation of fetal heart rate traces is significantly affected by intra- and inter-observer error.
- Maternal infections, including HIV, hepatitis and herpes simplex virus, are conditions that are associated with an increased transmission risk to the baby with the use of fetal blood sampling.
- The use of fetal blood sampling in the presence of abnormal fetal heart rate patterns in premature babies (less than 34 weeks of gestation) may be associated with an increase in adverse neonatal outcome.

CONTRAINDICATIONS

CONTRAINDICATIONS

Fetal blood sampling is contraindicated in the presence of maternal infection (e.g., human immunodeficiency virus, hepatitis viruses, and herpes simples virus), fetal bleeding disorders (e.g., haemophilia), and prematurity (<34 weeks).

QUALIFYING STATEMENTS

QUALIFYING STATEMENTS

Clinical guidelines have been defined as 'systematically developed statements which assist clinicians and patients in making decisions about appropriate treatment for specific conditions.' The parameters of practice included in this document were arrived at after careful consideration of the available evidence and should be considered as guidelines only. Clinicians involved in intrapartum care must use their professional knowledge and judgment when applying the recommendations to the management of individual women.

The recommendations have been combined into a clinical practice algorithm, in order to allow the findings from this guideline to be integrated and implemented in clinical practice. The algorithm aims to guide users through the decision pathways assessing the monitoring needs of any woman admitted in labour. The algorithm draws directly on the evidence presented in the guideline and, hence, is not recommended for use without prior consultation of this evidence. This algorithm was modeled around a practice guideline developed at Nottingham City Hospital under the supervision of Rosemary Buckley and the Guideline Development Group thanks them for allowing the use their guideline as a model for the development of this current algorithm.

IMPLEMENTATION OF THE GUIDELINE

DESCRIPTION OF IMPLEMENTATION STRATEGY

The implementation of the guideline should be undertaken within the strategic framework of the health improvement plans for each local health community.

Local health communities will need to review existing service provision against the guidance. This review should result in a strategy which identifies the resources required to implement fully the recommendations, the people and processes involved and the timeline over which full implementation is envisaged.

Clinicians with responsibility for the care of women should review their current practice in line with the recommendations. To enable clinicians to audit their own compliance with this guidance it is recommended that comprehensive clinical records should at least include those items described in Section 6.2 of the original guideline document.

The following audit criteria can be used to support the evaluation of clinical practice and continuous improvement in intrapartum care of the mother and baby. The audit criteria require the recording of admission risk factors, in addition to the subsequent clinical observations and interpretations:

- Number (and %) of women assessed as at high risk on admission and subsequently (based on the guidance in Section 4 of the guideline and the clinical practice algorithm in Section 2.10).
- Number (and %) of women who receive continuous electronic fetal monitoring and the main indication for continuous electronic fetal monitoring (based on the recommendations in Section 2 of the original guideline document and the clinical practice algorithm).

This information should be incorporated into local audit data-recording systems and consideration given (if not already in place) to the establishment of appropriate categories in routine electronic record-keeping systems. Further local evaluation of the use of fetal monitoring may be needed and could include:

- Clinical audit of aspects of structure (e.g. availability of blood sampling facilities, assessment and training of staff)
- Process (fetal heart rate features, blood pH etc.)
- Outcomes (maternal satisfaction and operative delivery rates, and neonatal outcomes such as cerebral palsy, perinatal deaths).

Prospective clinical audit programmes should record the proportion of treatments adhering to this guidance. Such programmes are likely to be more effective in improving patient care when they form part of the organisation´s formal clinical governance arrangements and where they are linked to specific postgraduate activities.

Relevant local clinical guidelines and protocols for fetal monitoring should be reviewed in the light of this guidance.

INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT CATEGORIES

IOM CARE NEED

Staying Healthy

IOM DOMAIN

Effectiveness
Patient-centeredness
Safety

IDENTIFYING INFORMATION AND AVAILABILITY

BIBLIOGRAPHIC SOURCE(S)

Royal College of Obstetricians and Gynaecologists. The use of electronic fetal monitoring. The use and interpretation of cardiotocography in intrapartum fetal surveillance. London: RCOG Press; 2001 May. 136 p. (Evidence-based clinical guidelines; no. 8). [246 references]

ADAPTATION

Not applicable: The guideline was not adapted from another source.

DATE RELEASED

2001 May

GUIDELINE DEVELOPER(S)

Royal College of Obstetricians and Gynaecologists - Medical Specialty Society

GUIDELINE DEVELOPER COMMENT

The guideline was developed by a multi-professional and lay working group (the Guideline Development Group) convened by the Royal College of Obstetricians and Gynaecologists. Members included representatives from:

- Royal College of Obstetricians and Gynaecologists
- Royal College of Midwives
- Royal College of Paediatricians and Child Health
- Royal College of General Practitioners
- British Maternal and Fetal Medicine Society
- British Association of Perinatal Medicine
- Faculty of Public Health
- Centre for Health Information Quality
- University of East Anglia (health economists)
- Confidential Enquiry into Stillbirths and Deaths in Infancy
- Consumer groups, including the National Childbirth Trust and the Stillbirth and Neonatal Death Society

Staff from the Royal College of Obstetricians and Gynaecologists Clinical Effectiveness Support Unit (CESU) provided support and guidance with the guideline development process, undertook the systematic searches, retrieval and appraisal of the evidence and wrote successive drafts of the document.

SOURCE(S) OF FUNDING

Supported by funding from the Department of Health and the National Institute for Clinical Excellence

GUIDELINE COMMITTEE

Guideline Development Group

COMPOSITION OF GROUP THAT AUTHORED THE GUIDELINE

Committee Members: Professor DK James (Chairman); Professor S Arulkumaran; Dr J Chapple; Mr AJ Dawson; Professor KR Greene; Dr G Lewis; Dr M Macintosh; Professor N Marlow FRCPCH; Ms L Pengelley; Ms J Rogers; Professor P Steer; Dr A Foulkes; Mr P Harris; Mr R Cookson; Mrs S Annis-Salter; Ms J M Thomas; Mr A Kelly; Ms J Kavanagh

FINANCIAL DISCLOSURES/CONFLICTS OF INTEREST

All members of the Guideline Development Group made formal declarations of interest at the outset, which were recorded. This record is kept on file at the Royal College of Obstetricians and Gynaecologists (RCOG). The Royal College of Obstetricians and Gynaecologists was of the opinion that the interests declared did not conflict with the guideline development process.

GUIDELINE STATUS

This is the current release of the guideline.

An update is not in progress at this time.

GUIDELINE AVAILABILITY

Electronic copies: Available (in Portable Document Format [PDF] format) from the Royal College of Obstetricians and Gynaecologists' (RCOG) Web site.

Print copies: Available from the Royal College of Obstetricians and Gynaecologists' (RCOG) Bookshop, 27 Sussex Place, Regent's Park, London NW1 4RG; Telephone: +44 020 7772 6276; Fax, +44 020 7772 5991; e-mail: bookshop@rcog.org.uk. A listing and order form are available from the RCOG Web site.

AVAILABILITY OF COMPANION DOCUMENTS

The following is available:

- NICE short form guideline on the use of electronic fetal monitoring London: National Institute for Clinical Excellence (NICE), 2001 May. 17 p.

Available from the National Institute for Clinical Excellence Web site:

- HTML format
- Portable Document Format (PDF)

Print copies: Available from the National Health Service (NHS) Response Line 0870 1555 455, ref: 23807. 11 Strand, London, WC2N 5HR.

PATIENT RESOURCES

The following is available:

- Monitoring your baby's heartbeat in labour – information for pregnant women. National Institute for Clinical Excellence (NICE), 2001 May. 8 p. Available from the National Institute for Clinical Excellence Web site.
- Monitoring your baby's heartbeat in labour - information for pregnant women (a Welsh version). National Institute for Clinical Excellence (NICE), 2001 May. 8 p. Available from the National Institute for Clinical Excellence Web site.

Print copies: Available from the National Health Service (NHS) Response Line 0870 1555 455, ref: 23809. 11 Strand, London, WC2N 5HR.

NGC STATUS

This summary was completed by ECRI on November 26, 2001. The information was verified by the guideline developer as of February 22, 2002.

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Date Modified: 11/8/2004